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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,697	08/26/2006	Axel Clausen	LAN0076US	3817

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EXAMINER	
NEFF, MICHAEL R	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
12/21/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/559,697	CLAUSEN ET AL.	
	Examiner	Art Unit	
	MICHAEL R. NEFF	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 September 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8,11-14,16-19 and 21-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8, 11-14, 16-19, 21-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

2. Applicant's arguments, see pre-appeal request for review, filed 9/11/2010, with respect to the rejection(s) of claim(s) 8 and 16 subsections b, c and d under Henkel have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Taunton.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 8, 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater et al. (herein after Awater) (US Patent 6,175,551 B1, see IDS) in view of Schenk (US Patent 6,529,925 B1, see IDS) and Taunton (US Publication 2003/0026263).

Re claim 8 Awater discloses a method for reducing the crest factor of a data symbol to be transmitted in a multi-carrier data transmission system (Col. 1 line 17-51), the data symbol being a function of a plurality of signals provided within a

predetermined data frame (Col. 1 line 17-37), each of the plurality of signals allocated to a carrier (Col. 1 line 17-37), each carrier occupying at least one frequency from a transmit data spectrum (Col. 1 line 17-37), the method comprising: receiving the predetermined data frame, the predetermined data frame exhibiting the data symbol and a cyclic prefix which is derived from a part of the data symbol (Col. 3 line 54-Col. 4 line 13); and performing crest factor reduction corresponding to the predetermined data frame based at least in part on peak values within the cyclic prefix of the predetermined data frame (Col. 3 line 54-Col. 4 line 30; Figure 2 elements 30, 34).

Within the disclosure and cited areas, Awater does not specifically discuss reducing the crest factor of the multi-carrier signal. However, based on the disclosure of the applicant at Paragraph 0006 of the current application, the PAP ratio is directly correlated to the derivation of the crest factor; therefore it would have been obvious to one of ordinary skill in the art that the PAP ratio reduction would result in the reduction of the crest factor for the multi-carrier signal.

Further the disclosure of Awater fails to explicitly disclose (1) the limitation of at least one carrier being reserved which is not provided for the data transmission; and (2) (a) filtering the data symbol and the cyclic prefix; (b) determining whether a time-domain function of the data symbol and of the cyclic prefix within the predetermined data frame exhibits at least one peak value that exceeds a first threshold; (c) determining an amplitude of an exhibited peak value and an associated position within the predetermined data frame; (d) generating a correction function by scaling and transposing a sample correction function in dependence on the amplitude and

associated position of the exhibited peak value; using the at least one carrier which is not available for data transmission for generating the sample correction function in the time domain; and (e) modifying the data symbol to be transmitted by superimposing the correction function.

Regarding item (1) this method is however rendered obvious by the disclosure of Schenk. Schenk discloses where at least one carrier being reserved which is not provided for the data transmission (Col. 1 lines 48-60) and further using the at least one carrier which is not available for data transmission for generating the sample correction function in the time domain (Col. 1 lines 48-60) as being a well known tactic in the area of multi-carrier communication as a means for providing an initial reduction to the crest factor.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Awater in order to incorporate the processing method of Schenk wherein carrier reservation is utilized in to use this well known method to provide further reduction of the crest factor for the multi-carrier signal.

Regarding item (2) this design is disclosed by Taunton. Taunton discloses (a) filtering the data symbol and the cyclic prefix (Paragraphs 0041 and 0045); (b) determining whether a time-domain function of the data symbol and of the cyclic prefix within the predetermined data frame exhibits at least one peak value that exceeds a first threshold (Abstract, 0038, 0040, 0041); (c) determining an amplitude of an exhibited peak value and an associated position within the predetermined data frame (Paragraphs 0064, 0071-72); (d) generating a correction function by scaling and

transposing a sample correction function in dependence on the amplitude and associated position of the exhibited peak value (0040, 0063-0067, 0026); and (e) modifying the data symbol to be transmitted by superimposing the correction function (Paragraph 0067).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the crest factor reducing processing and regeneration structure designed for peak detection and reduction means as disclosed by Taunton within the combined crest factor reduction method disclosed by Awater in order to gain the added benefit of further detail and efficiency in the peak reduction processing methods.

Re Claim 11, the combined disclosure of Awater, Schenk and Taunton as a whole disclose the method as claimed in claim 8, Taunton further discloses the method further comprising repeating steps (b) - (e) until the data symbol no longer exhibits any peak values above the first threshold and/or a predetermined number of iteration steps has been reached (Paragraph 0097).

Re Claim 12, the combined disclosure of Awater, Schenk and Taunton as a whole disclose the method as claimed in claim 8, Taunton further discloses the method comprising repeating steps (a) - (e) are repeated until the data symbol no longer exhibits any peak values above the first threshold and/or a predetermined number of

iteration steps has been reached, the data symbol modified by the correction function being used for the filtering in step (a) (Paragraph 0097).

Re Claim 13, the combined disclosure of Awater, Schenk and Taunton as a whole disclose the method as claimed in claim 8, Taunton further discloses the method further comprising oversampling at least the data symbol prior to step (b) (Paragraph 0035, 0041).

5. **Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Awater in view of Schenk, Taunton as applied to claim 8 above and further in view of Henkel et al. (herein after Henkel) (US Publication "PAR reduction revisited: an extension of Tellado's method", see IDS).**

Re Claim 14, the combined disclosure of Awater, Schenk and Taunton as a whole disclose the method as claimed in claim 8, but fail to explicitly disclose the method wherein step (d) further comprises using a dirac-like function as the sample correction function.

This design is provided by Henkel. Henkel discloses the method wherein step (d) further comprises using a dirac-like function as the sample correction function (Page 31-2 Section II).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate peak detections and reduction method as disclosed by Henkel within the combined crest factor reduction method disclosed by

Awater in order to gain the added benefit of further detail and efficiency in the peak reduction processing methods.

6. **Claims 16-19, 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater in view of Schenk and Taunton.**

Re claim 16 Awater discloses a method for reducing the crest factor of a data symbol to be transmitted in a multi-carrier data transmission system (Col. 1 line 17-51), the data symbol being a function of a plurality of signals provided within a predetermined data frame (Col. 1 line 17-37), each of the plurality of signals allocated to a carrier (Col. 1 line 17-37), each carrier occupying at least one frequency from a transmit data spectrum (Col. 1 line 17-37), the method comprising: (a) receiving the predetermined data frame, the predetermined data frame having the data symbol and a prefix which is derived from a part of the data symbol (Col. 3 line 54-Col. 4 line 13); and (b) performing crest factor reduction corresponding to the predetermined data frame based at least in part on peak values within the cyclic prefix of the predetermined data frame (Col. 3 line 54-Col. 4 line 30; Figure 2 elements 30, 34).

Within the disclosure and cited areas, Awater does not specifically discuss reducing the crest factor of the multi-carrier signal. However, based on the disclosure of the applicant at Paragraph 0006 of the current application, the PAP ratio is directly correlated to the derivation of the crest factor; therefore it would have been obvious to one of ordinary skill in the art that the PAP ratio reduction would result in the reduction of the crest factor for the multi-carrier signal.

Awater further fails to explicitly disclose wherein (1) and (2) step (b) further comprises determining an amplitude of an identified peak value and an associated position within the predetermined data frame; and generating a correction function by scaling and transposing a sample correction function in dependence on the amplitude and associated position of the identified peak value and using the at least one carrier which is not available for data transmission for generating the sample correction function in the time domain.

Regarding item (1) this method is however rendered obvious by the disclosure of Schenk. Schenk discloses where at least one carrier being reserved which is not provided for the data transmission (Col. 1 lines 48-60) and further using the at least one carrier which is not available for data transmission for generating the sample correction function in the time domain (Col. 1 lines 48-60) as being a well known tactic in the area of multi-carrier communication as a means for providing an initial reduction to the crest factor.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Awater in order to incorporate the processing method of Schenk wherein carrier reservation is utilized in to use this well known method to provide further reduction of the crest factor for the multi-carrier signal.

Regarding item (2) above Taunton discloses wherein step (b) further comprises determining an amplitude of an identified peak value and an associated position within the predetermined data frame (Abstract, 0038, 0040- 0041, 0064, 0071-72); and generating a correction function by scaling and transposing a sample correction function

in dependence on the amplitude and associated position of the identified peak value (0040, 0063-0067, 0026).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the crest factor reducing processing and regeneration structure designed for peak detection and reduction means as disclosed by Taunton within the combined crest factor reduction method disclosed by Awater in order to gain the added benefit of further detail and efficiency in the peak reduction processing methods.

Re claim 17, the combined disclosure of Awater, Schenk and Taunton disclose the method as claimed in claim 16, Taunton further discloses wherein the step (b) further comprises searching for peak values exceeding a first threshold in the data symbol and in the cyclic prefix (Abstract, 0038, 0040, 0041).

Re claim 18; the combined disclosure of Awater, Schenk and Taunton disclose the method as claimed in claim 17, Taunton further discloses the method wherein in step (b) further comprises filtering the data symbol and the cyclic prefix over the predetermined data frame prior to searching for peak values (Paragraphs 0041 and 0045).

Re Claim 19, the combined disclosures of Awater and Henkel disclose the method as claimed in claim 18, Henkel further discloses the method wherein filtering the

data symbol and cyclic prefix further comprises using filtering characteristics corresponding to a downstream filter of the multi-carrier data transmission system (Paragraphs 0041 and 0045).

Re Claim 21, the combined disclosures of Awater and Henkel disclose the method as claimed in claim 20 (16), Henkel further discloses the method wherein step (b) further comprises modifying the data symbol to be transmitted by superimposing the correction function (Paragraph 0067).

Re Claim 22, the combined disclosure of Awater, Schenk and Taunton disclose the method as claimed in claim 17, Taunton further discloses the method wherein step (b) further comprises oversampling at least the data symbol prior to searching for peak values (Paragraph 0035, 0041).

7. **Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Awater in view of Schenk, Taunton as applied to claim 16 above and further in view of Henkel et al. (herein after Henkel) (US Publication "PAR reduction revisited: an extension of Tellado's method", see IDS).**

Re Claim 14, the combined disclosure of Awater, Schenk and Taunton as a whole disclose the method as claimed in claim 8, but fail to explicitly disclose the method wherein step (d) further comprises using a dirac-like function as the sample correction function.

This design is provided by Henkel. Henkel discloses the method wherein step (d) further comprises using a dirac-like function as the sample correction function (Page 31-2 Section II).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate peak detections and reduction method as disclosed by Henkel within the combined crest factor reduction method disclosed by Awater in order to gain the added benefit of further detail and efficiency in the peak reduction processing methods.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL R. NEFF whose telephone number is (571)270-1848. The examiner can normally be reached on Monday - Friday 8:00am - 4:30pm EST ALT Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571)272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL R. NEFF/
Examiner, Art Unit 2611
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